



US007561141B2

(12) **United States Patent**  
**Shahoian et al.**

(10) **Patent No.:** **US 7,561,141 B2**  
(45) **Date of Patent:** **\*Jul. 14, 2009**

(54) **HAPTIC FEEDBACK DEVICE WITH BUTTON FORCES**

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(75) Inventors: **Erik J. Shahoian**, San Leandro, CA (US); **Christopher J. Hasser**, San Jose, CA (US); **Louis B. Rosenberg**, San Jose, CA (US)

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(73) Assignee: **Immersion Corporation**, San Jose, CA (US)

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 342 days.

This patent is subject to a terminal disclaimer.

(Continued)

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(21) Appl. No.: **10/782,939**

International Search Report for International Application No. PCT/US2005/036861, date of mailing Feb. 23, 2006.

(22) Filed: **Feb. 23, 2004**

(Continued)

(65) **Prior Publication Data**

US 2005/0128186 A1 Jun. 16, 2005

*Primary Examiner*—Regina Liang

(74) *Attorney, Agent, or Firm*—Kilpatrick Stockton LLP

**Related U.S. Application Data**

(63) Continuation of application No. 09/741,310, filed on Dec. 19, 2000, now Pat. No. 6,697,044, which is a continuation of application No. 09/156,802, filed on Sep. 17, 1998, now Pat. No. 6,184,868.

(51) **Int. Cl.**  
**G09G 5/00** (2006.01)

(52) **U.S. Cl.** ..... **345/156; 345/184**

(58) **Field of Classification Search** ..... 345/156–169, 345/173, 184; 715/701, 702  
See application file for complete search history.

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(57) **ABSTRACT**

A haptic feedback control device, such as a handheld remote control or handheld game controller, for controlling a graphical object within a graphical display and for outputting forces to a user. A housing includes a button, wherein the user engages the button with a finger. The button is depressible along a degree of freedom by the user. An actuator applies forces to the user through the button along the degree of freedom. A sensor detects displacement of the button along the degree of freedom when the button is depressed by the user. A process, local to the device, controls the actuator to generate the forces upon the button in the degree of freedom to provide a tactile sensation to the user contacting the button.

**29 Claims, 12 Drawing Sheets**

